

WHAT IS CLAIMED IS:

1. A polyvalent multimeric complex comprising a plurality of pRNA
chimeras, at least one pRNA chimera comprising (a) a pRNA region and (b) a
5 spacer region comprising a biologically active RNA, the spacer region
covalently linked at its 5' and 3' ends to the pRNA region.
2. The polyvalent multimeric complex of claim 1 wherein the biologically
active RNA is selected from the group consisting of a ribozyme, a siRNA, an
10 RNA aptamer, an antisense RNA and a peptide nucleic acid (PNA).
3. The polyvalent multimeric complex of claim 1 wherein the RNA aptamer
binds a cell surface receptor.
- 15 4. The polyvalent multimeric complex of claim 1 wherein the RNA aptamer
binds an endosomal disruption agent.
5. The polyvalent multimeric complex of claim 1 wherein the RNA aptamer
binds to a virus.
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6. The polyvalent multimeric complex of claim 5 wherein the virus is an
adenovirus.
7. The polyvalent multimeric complex of claim 5 wherein the virus comprises
25 a polynucleotide that operably encodes a therapeutic agent.
8. The polyvalent multimeric complex of claim 1 comprising a pRNA
chimera comprising an RNA aptamer the binds a cell surface receptor; a
pRNA chimera comprising an RNA aptamer that binds an endosomal
30 disruption agent; and a pRNA chimera comprising a therapeutic RNA.
9. The polyvalent multimeric complex of any of the preceding claims wherein
the spacer regions comprise the same or different biologically active RNAs.

10. The polyvalent multimeric complex of any of the preceding claims which is a dimer, a trimer or a hexamer.
- 5 11. A polyvalent multimeric complex comprising a plurality of pRNA chimeras, each pRNA chimera comprising (a) a pRNA region and (b) a spacer region comprising a biologically active moiety.
- 10 12. The polyvalent multimeric complex of claim 11 wherein at least one of the pRNA chimeras comprises a RNA aptamer bound to the biologically active moiety.
13. The polyvalent multimeric complex of claim 12 wherein the biologically active moiety bound to the RNA aptamer is not an RNA molecule.
- 15 14. The polyvalent multimeric complex of claim 13 wherein the biologically active moiety is a peptide, a protein, a nucleic acid or a virus.
- 16 15. The polyvalent multimeric complex of claim 13 wherein the biologically active moiety is an adenovirus.
- 20 16. The polyvalent multimeric complex of claim 15 wherein the adenovirus comprises a polynucleotide that operably encodes a therapeutic agent.
- 25 17. A method for delivering a therapeutic agent to a cell comprising:
contacting the cell with the polyvalent multimeric complex of any of the previous claims, wherein a first pRNA chimera of the polyvalent multimeric complex comprises a therapeutic agent and a second pRNA chimera of the polyvalent multimeric complex comprises a biologically active moiety that specifically binds a component of the cell membrane, such that the
30 polyvalent multimeric complex is taken up by the host cell.

18. The method of claim 18 wherein the component of the cell membrane to which the polyvalent multimeric complex binds is a receptor, and wherein the polyvalent multimeric complex is taken up by the cell via receptor-mediated endocytosis.

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19. The method of claim 18 wherein a third pRNA chimera of the polyvalent multimeric complex comprises an endosomal disruption agent.

20. The method of claim 18 wherein the third pRNA chimera comprises an RNA aptamer that binds the endosomal disruption agent.

21. The method of claim 20 wherein the endosomal disruption agent comprises an adenovirus.

22. The method of claim 21 wherein the adenovirus comprises a polynucleotide operably encoding a therapeutic agent.

23. A method for delivering a therapeutic agent to a cell comprising:
contacting the cell with a polyvalent multimeric complex of any claims 1-16, wherein a first pRNA chimera of the polyvalent multimeric complex comprises an adenovirus comprising a polynucleotide operably encoding a therapeutic agent, and a second pRNA chimera of the polyvalent multimeric complex comprises a biologically active moiety that specifically binds a component of the cell membrane, such that the polyvalent multimeric complex is taken up by the host cell.

24. The method of claim 23 wherein the component of the cell membrane to which the polyvalent multimeric complex binds is a receptor, and wherein the polyvalent multimeric complex is taken up by the cell via receptor-mediated endocytosis.

25. The method of any of claims 17-24 wherein the cell is present in a cell culture, a tissue, an organ or an organism.

26. The method of any of claims 17-25 wherein the cell is a mammalian cell.

27. The method of claim 26 wherein the cell is a human cell.

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